DOCUMENT RESUME

ED 314 115 JC 900 029

TITLE California Department of Education and California Community College Chancellor's Office Vocational and Technical Education Computer-Managed and Aided Instruction Project: Project Summary.

INSTITUTION California Community Colleges, Sacramento. Office of the Chancellor.; California State Dept. of Education, Sacramento.

PUB DATE 89

NOTE 50p.

PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.

DESCRIPTORS Community Colleges; *Computer Assisted Instruction; *Computer Oriented Programs; *Computer Software Reviews; Educational Technology; Futures (of Society); *Job Training; *Retraining; *School Business Relationship; Skill Obsolescence; Teacher Workshops; Technological Literacy; Two Year Colleges

ABSTRACT

This description of the Computer-Managed and Aided Instruction (CMAI) Project includes a summary of a December 1989 CMAI planning meeting, the text of a paper presented at the meeting, and descriptions of each of the five phases of the project. The paper, "Programming the Future," by Gerald C. Angove and Scott Smith, discusses: (1) the far-reaching impact of microcomputers and innovative software on industry, the workforce, and education; (2) the need for more highly skilled, knowledgeable workers in the American education system; (3) the need for a partnership between industry and education to transform the single-skilled worker into a multi-skilled worker; (4) a training partnership developed between Pacific Bell and Sierra Community College, and the resulting benefits to both parties; (5) the challenge to train a new generation of workers and retrain 80% of today's workforce in the next 5 years; and (6) the need for industry to provide resources to enable educators to be better prepared for the training and retraining challenge. The five phases of Sierra Community College's CMAI project are described next. Phase I involved the identification and evaluation of computer programs available in all vocational trades, the publication of a catalog of software, the identification of additional software requirements, the development of software to supplement existing packages, and a series of teacher workshops focusing on results. Phase II of the project was devoted to updating software, evaluating programs not assessed in phase I, and strengthening the evaluation instruments. During phase III, the need to update software evaluations became more apparent and, as a result, the CMAI workshops focused on informing instructors about the changes in software programs that would affect their curricula. A significant accomplishment of phase IV was the redesigning, updating, and strengthening of the general, construction, computer-aided design, and electronics evaluation instruments. The objectives of phase V included the development of a library of evaluated computer software, the evaluation of new software, and the inclusion of electronic publishing technology in the software evaluations. (JMC)

ED314115

# California Department of Education and California Community College Chancellor's Office Vocational and Technical Education Computer-Managed and Aided Instruction Project

## Project Summary

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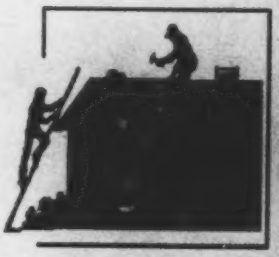

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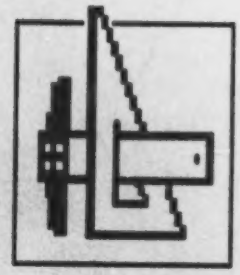

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EXECUTIVE SUMMARY

Computer-Managed and Aided Instruction (CMAI) Project Executive Planning Meeting,December 2, 1989, American Vocational Association Conference, Orlando, Florida.

Meeting Attendees:

| | |
|---|---|
| Charlie Buzzell, | Executive Director, AVA |
| Neil Edmonds, | AVA Past President |
| Bob Jones, | Assistant Secretary, Manpower and Training, U.S. Department of Labor |
| Betsy Brand, | Assistant Secretary, Vocational and Adult Education, U.S. Department of Education |
| James Van Erden, | Director, Bureau of Apprenticeship and Training, U.S. Department of Labor |
| Lawerance Garretto | Assistant to the State Director of Vocational Education, Department of Education, State of California |
| Gerald Angove | President, Sierra Community College, California |
| Joe Oakey | Manager, Education Sales, Autodesk, Inc. |
| Roni Posner | Assistant Executive Director for Professional Development, AVA |
| Tom Castaldo | Project Manager, CMAI Project |

Others unable to Attend:

| | |
|---|---|
| Dale Parnell, | Executive director, American Association of Community and Junior Colleges |
| Jerry Hayward | Vice Chancellor, National Research Center for Vocation Education, |
| Bill Anderson | Director, Vocational Education, California Community Colleges |
| Joel Orr | President, National Association Computer Graphics Association |
| John Heffner | Director, Manpower and Training, Associated General Contractors of America |

Meeting Objective:
To review and access the global potential and need of the Sierra Community College CMAI project and discuss a plan for its continuance.

The meeting commenced with a video film with an introduction by Brig. General Chuck Yeager of the CMAI project. It communicated the revolution of the microcomputer and the impact of the on slaught of software programs on vocational technical instructors in education. The need to maintain and attain currency in the new emerging technologies. And finally, the goals, objectives and accomplishments of the CMAI in satisfying the critical needs of the vocational instructor.

Jerry Angove presented a paper which was co-authored by Scott Smith, Vice President, Pacific Bell, Subject: Programming The Future. The paper portrayed:

The far reaching impact microcomputers and innovative software is having in U.S. industry, its work force and education.

The significance of the need for more highly skilled, the knowledgeable worker, on the american education system.

The partnership which must be developed between industry and education to transform the single skilled to a multi-skilled worker.

The partnership alliance developed between Pacific Bell and Sierra Community College to keep our work force technologically competitive in the 21st Century.

How the CMAI project has further linked industry and education, a project which has mutually benefitted both parties.

How industry has benefited by having its programs evaluated and results included in a widely distributed directory, educators benefiting by saving hours and energies in finding and maintaining currency in various software programs.

The challenge to train the new generation of workers entering technological training and retraining 80% of today's work force in the next 5 years.

Finally, the need of industry to provide needed resources to enable educators to be better prepared for the training and retraining challenge.

The group concluded that it was vital to update, maintain vocational instructors instructional skills in microcomputer technologies. Also, that a global mechanism needed to be developed to satisfy that need. It was generally agreed that the CMAI project could logically provide the foundation for the development of a strategy and long-range plan to satisfy this need. It was concluded that resources needed to be identified to develop this long range plan. Preliminary estimates indicated that $150,000 would be required to develop and complete a plan. During the meeting a source of funds could not be immediately identified to fund the plan, except a commitment of $10,000 by the California Department of Education and California Community Colleges.

The meeting adjoined with the conclusion that:

The CMAI project did have global application potential.

Attending agencies would investigate avenues for possible funding for accomplishing a long plan for the contiuance of the project.

The college was encouraged to develop a unsolicited proposal to the Department of Education and Department of Labor.

The Department of Labor was interested in the 2+2 program and it was agreed that the college would send them information on that project.

Other participants stated that they would look for other sources for CMAI funding.
AVA was encouraged to seek support of corporate entities to assist in the funding of the long range planning of the CMAI project.

# *"PROGRAMMING THE FUTURE"*

**Presented by**

Dr. Gerald C. Angove, President, Sierra College

*and*

Scott Smith, Vice President, Pacific Bell

SIERRA COLLEGE

**December 1989**

## " PROGRAMMING THE FUTURE "

In less than a few decades, a new force has been released into the 20th century. It is a force so powerful it is being discussed in the same breath as the electric light bulb, the telephone, the automobile, and the airplane. The era of industrialization in our nation and the world has now entered the era of computer technology. One can almost physically feel the dynamics of this new age. Individuals and companies can either be caught up in this powerful "pull" or be left behind. "In a life where death is the hunter, my friend, there is no time for fear or regrets—only *decisions*" (Don Juan, The Tale of Power).

Microcomputers and innovative software are forcing *decisions* to be made which have had far reaching impact on U.S. industry and its work force. Computer technology is causing a revolution in American society. And, because it is a revolution—not evolution—it is only logical that the worker is the one most affected by this constant, rapid, and drastic transformation in the workplace. This technological change is creating demands for a more highly skilled person in the manufacturing sector. This, in turn, is having a significant influence on the American educational system. "Today, we are in the early stages of a social and technological revolution that should drastically and

irrevocably change the meaning of education and the art of teaching in our society. In fact, education will need to change more during the next three decades than it has since the modern school was created by the appearance of the printed book over 300 years ago" (Peter Drucker—The New Realities: In Government and Politics/In Economics and Business/In Society and World View).

For American industry to compete globally today, it must have a highly skilled work force using the latest technologies. Fifteen to twenty years ago, American manufacturers were looking at a single-skilled environment. Workers received high wages for doing repetitive, relatively unskilled tasks. But, in this new technological age, the single-skilled worker is a dinosaur. Workers in today's society must, instead of performing a single task, participate in multiple levels of decision making in the production process. They will be involved in the design and implementation of all factory processes, particularly those which are computer aided.

The question which naturally surfaces is: how does the single-skilled worker become a multi-skilled individual? Industry has experimented with providing its own employee training and retraining programs and is finding that it isn't the most efficient educator. America's manufacturers recognize

they are spending too much money and management time on training, which is draining energy from production tasks. Currently, industry is spending $30 to $40 billion annually on this effort! Additionally, businessmen are finding they don't have the teaching skills required for the job, particularly when Department of Labor statistics are viewed which show that within the next five years 80 percent of the current work force will need retraining, in addition to a new generation of workers just entering technology training. The natural progression of the teaching process must lead to educational institutions to fulfill this challenge. The primary key to economic prosperity is the development of the full potential of the work force.

It's interesting to note that GM, Ford, and AT&T have shifted their training focus from corporately run programs to partnerships with community colleges realizing that America has a natural resource in its community college system. This system is in the business of education and training and can produce the "knowledgeable worker," one who is multiple skilled and conditioned to the need for periodic retraining.

Sierra Community College, located in the Sierra foothills approximately 16 miles east of Sacramento, is, instead of the three "R's" of educational days gone by, utilizing the three "P's"—Potential for growth, Planning, and

Programs in order to meet the vision of the future. As Sierra's CEO, one of my top priorities is to surround myself with enterprising, imaginative, educated people, who maintain not just a regional or local view, but who are concerned with a global outlook. I select individuals who are capable of making decisions and following through to make sure these decisions are implemented. These staff members are in tune with the quality of their community and region, dedicated to the training and retraining of the work force. They have "geared up" to provide the required customized education. As an example, Sierra College is in the forefront by furnishing state-of-the-art training via the micro-wave transmitter throughout its district. The college is using cable television satellite transmissions to provide live classes directly into businesses and homes in the 3,200-square mile district.

Sierra College is an institution that

- offers both the nontraditional and futuristic education for the future.
- realizes the need to have a partnership with industry.
- is well aware of the importance of an ever-changing curriculum if it is to produce the multi-skilled workers needed today in the manufacturing sectors of our local and regional communities.

Partnerships between industry and education produce mutually beneficial situations. Industry can supply training resources which are, in many cases, beyond the budget of the academic institutions. A firm is most successful when its efforts are focused, when corporate energy is expended on doing what the company does best—production. California's Pacific Bell bought into this strategy in 1986 when it decided to concentrate on providing communication products and services and leave to educators the job of training its workers. Pacific Bell realizes it is critical that its employees keep up with technology. "Advances in technology are providing a wide variety of new opportunities to enhance the education of our young people," said Terry M. Mulready, Pacific Bell vice president for corporate communications and chair-person for the coalition of businesses supporting new technological legislation. "We need to seize these opportunities if we want tomorrow's work force to be the very best in a highly complex world. (We) must excel in the area of educational technology if we hope to maintain a competitive edge in the international economy of tomorrow."

The partnership between Pacific Bell and Sierra Community College reflects the kind of alliance between education and industry that is needed to keep America technologically competitive in the 21st century. With Sierra

College providing on-site classes custom tailored to the employees of Pacific Bell, faculty at Sierra College has been able to provide the expertise needed in retraining while being exposed to the corporate world at the same time. It has created a win-win situation for both of us.

In addition, Sierra College has been funded by the State Chancellor's Office of the California Community Colleges since 1986 for a project entitled "Computer Managed and Aided Instruction (CMAI)," which has further linked the college with industry. This project's staff has created evaluation instruments for computer software related to vocational trades and technology and has published a major directory of software packages complete with detailed evaluations of education and industry applications. Industry has displayed great enthusiasm for the project, as has the State Department of Education, which became joint funding sponsors of the project this year. Industry benefits by having its software programs evaluated and included in a widely distributed directory giving them immense exposure, and educators benefit by saving hours of time and energy wading through numerous journals and other materials trying to determine educational and industrial uses of various software packages that would be appropriate for purchase for classroom

training use. The project has received national attention and is growing at a faster rate than staff can manage due to limited personnel and funding.

That learning is a lifelong process is not a new or original concept, but what is new is the environment in which learning must occur. Today, we are faced with a great need for economic and human development through the training and retraining of our present work force and the work force of the future. The use of computer technology in this process is no longer an option, nor a luxury, but a necessity—a way of life. Industry and education must, out of mutual need, join together to provide the necessary link to do what each does best in order to give the workers of our nation the capability of competing in the global marketplace. Industry must be willing to provide needed resources, and educators must be prepared to offer training and retraining programs. The dawn of tomorrow is here, and we must be ready to meet the challenges of the new day.

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California Community Colleges
1985-86

# ABSTRACT

## PHASE I


I.D. Number: II-6-351

Project Title: Computer-Managed and Aided Instruction

Project Director: Dr. Paulette J. Perfumo,
Associate Dean of Vocational Education

Organization: Sierra Joint Community College District

Address: 5000 Rocklin Road
Rocklin, CA 95677

Phone: (916) 624-3333 Ext. 2452


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Microcomputer applications growth in the vocational trade areas of business and industry has placed a demand on the California Community College system to respond to that expansion. A myriad of computer software programs exist in all the trade areas. Software programs will be identified which are available in each trade area. A method for the evaluation of each of these software packages will be developed. Each software program will be evaluated against the established criteria. A catalog will be published which will include the results of each evaluation by subject area and their usefulness to education. In addition, additional software requirements will be identified. Then new software programs will be developed which supplement existing software packages. Within budget and time limitations, supplemental software requirements will be contracted out. The project will be accomplished using a participatory management approach. A steering committee will be established to provide guidance for the overall project. Then a working committee will be established for each subject area. A lead college project official will provide support in each subject area. A concept for the continual update and dissemination of updated information to affected colleges will be developed. This will include a concept of a central body of knowledge or lead college in each subject area. Procedures for its implementation and operation will be developed. Continuation requirements and a mechanism for the perpetuation of the project will be included in the final report.

## OBJECTIVES

## PHASE I

1. In each industrial educational area, identify the availability of software which can be used in the department's curriculum. Catalog the software by categories of interest for educational purposes, as identified by each discipline.

2. Develop for each area of interest an objective evaluation method to determine the usefulness of each software package. Test each software package against the requirements of each area and rank them in order of effectiveness. Publish by discipline the results of the findings.

3. Identify areas which require additional software needs. As well as areas where software does not currently exist in the market place.

4. Once software requirements are identified, develop an economical approach for the production of that software. Specifications for each software need should be identified using a systems approach and those which can be accomplished within a short term will be produced. Long term, large software needs should be identified with specifications identified for development.

5. Develop a software catalog for each discipline/trade. This library will provide a short description of each software package. In addition, the following information will be included in each catalog:

   a. Applicability of each package to each subject area within each discipline.
   b. The applicability of the package in the industry and its usefulness in the educational environment.
   c. Cost of the software for industry and to education.

6. Develop the concept for a central body of knowledge or lead college in each subject area. Establish the requirements for an institution to be the center of the body of knowledge in a subject area for the Community College system. Establish the necessary requirements for setting up the network and communication channels to implement such a system. Develop and document the procedures for the use and management of the system.

# FINAL REPORT

# PHASE I

# 1985-86 VOCATIONAL EDUCATION SPECIAL PROJECT

# COMPUTER-MANAGED AND AIDED INSTRUCTION

## PROJECT II-6-351-04

## SIERRA COMMUNITY COLLEGE

**PROJECT DIRECTOR**
Dr. Paulette Perfumo

**PROJECT MANAGER**
Mr. Tom Castaldo

**February 18, 1986 through September 30, 1987**

This report is made pursuant to contract number II-6-351-04. This project was supported by Vocational Education Act of 1984 funds (Title II, Part B), P.L. 98-524, administered by the Chancellor's Office, California Community Colleges.

"The activity which is the subject of this report was supported in whole or in part by the U.S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Education and no official endorsement by the U.S. Department of Education should be inferred."

# EXECUTIVE SUMMARY

## PHASE I

Sierra College in February 1986, initiated the 1985-86 Vocational Education Computer-Managed and Aided Project. The project, scheduled to be completed on September 30, 1987 has been continued through March 31, 1988. Major objectives have been met to:

1. Identify, categorize, evaluate software useful in the Vocational Education Community College Curriculum.
2. Publish a software directory.
3. Conduct workshops of results.

To establish a framework to manage and direct the project, as a pilot test, the California Community College Vocational Education Technical Software Center (3C Voc Tec Software Center) was established. To keep the project within manageable limits, five vocational trade areas were identified for study. In addition, an equal number of colleges in a consortium effort were identified as **lead colleges** to direct, develop evaluation instruments and conduct evaluations. These areas and colleges are: Automotive, Evergreen Valley College; Construction, Sierra College; Drafting, Solano College; Electronics, American River College; and Manufacturing, Sacramento City College.

Overwhelming support was received from both industry and the education community. Over three hundred educators from community colleges, four year institutions, and secondary schools participated in the project. Over 130 vendors, which is growing everyday, participated in the project by responding to surveys, and making available literature and software programs for evaluation. Sixty-one companies made available 194 software programs (of which 101 are different programs) for evaluation. In addition, evaluation colleges have evaluated 20 software programs, which they have purchased from vendors. Total retail value of this concerted effort is over **$250,000.** Also, the backlog of programs to be reviewed subsequent to September 30, exceeds $25,000.

Performance standards through evaluation instruments have been developed in each of the areas. These standards have been incorporated in a Program Evaluation Data Management System for documenting, tracking and analyzing software programs evaluated in each of the study areas. Public Domain programs have been reviewed, incorporated into the directory and have been made available to instructors for their use.

Publicity and recognition of the project have been provided through presentations at the 1986 Fall Conference of the California Community College Administrators of Occupational Education, 1986 Annual Conference of California Industrial Education Association, 1987 California Vocational Education Conference, Alliance for Manufacturing Productivity sponsored by AutoDesk, 1987 Fall Conference Northern California Region CIEA Conference, AutoCAD Expo 87 and scheduled for the 1988 National Computer Graphic Association conference.

A solid foundation has been established to provide a central body of knowledge, and means for a permanent linkage between industry and education in each of the study areas. However, the work accomplished to date will lose its value if it is not continued, updated and funded on a continual basis. The results of this study have clearly delineated the need for this type of program on a continuing basis to facilitate the challenge to keep up with the rapidly changing vocational education technical areas. It is recommended without reservation that the project be continued either by the California Community Colleges or by private industry.

# ABSTRACT
# AND
# NEED TO CONTINUE COMPUTER-MANAGED AND AIDED INSTRUCTION EVALUATION PROJECT

## PHASE II

A Project of this kind is vitally needed by the California Community College System. The revolution of microcomputer technology in industry has/and will have a dramatic demanding impact on this nation's community college industrial education curriculum. The challenge to produce a work force with the skills needed to compete in today's world economy weighs heavily on our country's community college system. If the community college system does not immediately respond to these needs, then industry will, through necessity, develop their own training system. Industry today is spending 30 billion dollars on satisfying their own training needs.

It is virtually impossible for each community college to "go it alone" in keeping up with what is happening in the microcomputer technology world as it is affecting industry. Productivity increases of 50 to 400 percent are being realized. As a result of this technology, school systems and particularly community colleges must react to these changes or be left behind. In many instances, reaction to these changes involve complete restructuring of subject curriculums, and instructors learning new skills. The majority of community colleges do not have the time, manpower, resources, or money to maintain a system to keep up with today's technology developments. However, to stay viable, the community college system needs a vehicle to effectively and economically satisfy this need.

This project is a start in providing a way to update and maintain the vocational education system in the latest advancements in today's technology. To discontinue the project now would have the effect of losing:

1. The effort to establish a permanent evaluation system and a central body of knowledge for each vocational education area.
2. A single contact by industry with the California Community College system.
3. The national recognition and possible expansion nationally of the project.
4. The ability to quickly and effectively evaluate new software. The majority of the current effort has been expended in developing evaluation instruments, establishing contacts with industry and methods for management of a project of this magnitude.

## PROJECT OBJECTIVES

## PHASE II

1. Finalize, publish and distribute the Phase I software evaluation directory.

2. Within the austere funds provided, continue to identify, categorize, and evaluate software useful in the Vocational Education Community College Curriculum.

3. Continue to develop a foundation for on-going funding of the project.

# FINAL REPORT

# PHASE II

# 1986-87 VOCATIONAL EDUCATION SPECIAL PROJECT

# COMPUTER-MANAGED AND AIDED INSTRUCTION

## PROJECT II-6-351-04

## SIERRA COMMUNITY COLLEGE

**PROJECT DIRECTOR**
Dr. Paulette Perfumo-Kreiss

**PROJECT MANAGER**
Mr. Tom Castaldo

October 1, 1987 through September 30, 1988

This report is made pursuant to contract number II-6-351-04. This project was supported by Vocational Education Act of 1984 funds (Title II, Part B), P.L. 98-524, administered by the Chancellor's Office, California Community Colleges.

"The activity which is the subject of this report was supported in whole or in part by the U.S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Education and no official endorsement by the U.S. Department of Education should be inferred."

# EXECUTIVE SUMMARY

## PHASE II

The Chancellor's Office of the California Community Colleges in November 1987 approved the continuation of the Vocational Education Computer-Managed and Aided Instruction Project directed and managed by Sierra Community College. In Phase II of the project the following major objectives have been met:

1. Finalize, publish and distribute the Phase I software evaluation directory.

2. Within the austere funds provided, continue to identify, categorize, and evaluate software useful in the Vocational Education Community College Curriculum.

3. Continue to develop a foundation for on-going funding of the project.

The size of the initial directory is 840 pages, which is considerably larger than originally planned. Due to the size of the directory, printing was a time-consuming process. Three separate agencies participated in the publishing of the directory; Sierra College, California Department of Education, and California Department of Corrections. Over 1100 complete or partial copies were distributed to: California Community Colleges and Districts, vocational college instructors, California secondary vocational instructors, National Alliance of Community Colleges for Manufacturing, other educational institutions and participating software vendors. Included in the report were 207 program evaluations (87 commercial programs and 120 public domain programs). The retail value of the programs evaluated exceeded $270,000.

A survey of educators during the distribution of the directory showed strong support of the project. The results of the survey indicating the usefulness of the directory/project to instructors were as follows:

84% -Increase knowledge of instructors
91% -Help in selection of software
54% -Identify new course curriculum
63% -Identify areas of update for courses
52% -Identify new knowledge in industry
81% -Evaluation results of software
1% -Not useful

100% -Project should be continued

Phase II of the project was devoted to updating software, evaluating programs not done in Phase I and strengthening the evaluation instruments. The concept of Lead College Directors was continued for the five vocational areas: Automotive, Construction, Drafting, Electronics and Manufacturing Technologies. New lead college directors were selected for Electronics and Manufacturing.

Strong support of the project was continued by software vendors. A total of 34 program evaluations were updated or completed during this phase with a total retail value of $68,283. The evaluation results will be published in a directory update to be completed during Phase III of the project.

A solid foundation for providing a central body of knowledge and a means for a permanent linkage between industry and education are on-going objectives. The project has been continued through December 1988. Subsequent to that time, co-sponsorship with the California Department of Education and other educational agencies is being solicited. Phase II continued to identify the need for this type of project on an on-going basis in order to keep up with the rapidly changing vocational education technical areas. It is recommended, without reservation, that this project be continued by joint sponsorship of educational agencies and private industry.

California Community Colleges
1987-88

## ABSTRACT

## PHASE III


I.D. Number: II-6-351-4

Project Title: Computer-Managed and Aided Instruction in Industrial Education Areas

Project Director: Dr. Paulette J. Perfumo-Kreiss
Associated Dean of Vocational Education

Organization: Sierra Joint Community College District

Address: 5000 Rocklin Road
Rocklin, CA 95677

Phone: (916) 624-3333 Ext. 2452


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This is a continuing project which identifies computer software for industrial education under five (5) major disciplines [automotive, building construction, drafting, electronics/electrical and manufacturing technology]. The evaluations will be done by or directed by "lead colleges", who have established an expertise in each subject area. The project evaluates the software and provides in-service training for instructors on its utilization. The end product will be an update of a library of computer software which has been evaluated for use at the community college level, complete with its rating. This effort may be compared with the consumer report of information for the use by industrial education instructors.

The current project, directed and managed by Sierra College, has received overwhelming support from both industry and the education community. During Phase I of the project, over three hundred educators from community colleges, four year institutions and secondary schools participated. In addition, over 130 vendors, which is growing everyday, participated in the project by responding to surveys, and making literature and software programs available for evaluation. It is projected that by the end of Phase III, a value in excess of $350,000 worth of software will have been evaluated.

## OBJECTIVES

## PHASE III

1. Refine, update, improve, expand software library in each of the following industrial education areas:

   a. Automotive Technology
   b. Construction and Cabinetry Technology
   c. Drafting Technology
   d. Electronics Technology
   e. Manufacturing Technology

   Specific target areas will be in Automotive, Electronics, and Manufacturing. Broaden the applications in each of these areas to be covered which were not covered during the projects first phase. Examples would be: Microwave software applications, software for testing test equipment and software for teaching programming in electronics areas. Update evaluation instruments. Current instruments are first generation and current on going evaluations of software will identify instruments which can be improved. First generation evaluations will be updated based upon the latest versions of software products.

2. Continue to develop and refine the concept of a central body of knowledge or lead college in each of the subject areas. Consider expanding the number of lead colleges in drafting, electronics, and manufacturing to include the Southern California area. Establish the requirements for their selection. Time and budget permitting, expand the project to other subject areas.

3. Update the software directory for each subject area semi-annually. The following information will be listed for each product:

   a. Short description of each product as it can be used in education.
   b. Applicability of each package to each subject area within each discipline.
   c. The applicability of the package in the industry and its usefulness in the educational environment.
   d. Cost of the software for industry and to education.
   e. Ranking the products against like type systems.

4. Conduct workshops on software evaluated in the southern and northern parts of California. Workshops will emphasize how the integration of microcomputer technology in the curriculum enhances the integration of gender equality and other disadvantaged into the industrial trades sector of the economy.

5. Develop a computer network between the 3C Voc Tech Software Center and lead colleges. The primary purpose of this linkage will be to reduce time, cost, and improve coordination of software evaluations. Time and budget permitting, develop an electronic bulletin board at each of the lead colleges for dispensing information to all community colleges.

# FINAL REPORT

# PHASE III

# 1986-89 VOCATIONAL EDUCATION SPECIAL PROJECT

# COMPUTER-MANAGED AND AIDED INSTRUCTION

## PROJECT 87-0535

## SIERRA COMMUNITY COLLEGE

**PROJECT DIRECTOR**
Dr. Paulette Perfumo-Kreiss

**PROJECT MANAGER**
Mr. Tom Castaldo

October 1, 1988 through February 28, 1989

This report is made pursuant to contract number II-6-351-04. This project was supported by Vocational Education Act of 1984 funds (Title II, Part B), P.L. 98-524, administered by the Chancellor's Office, California Community Colleges.

"The activity which is the subject of this report was supported in whole or in part by the U.S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Education and no official endorsement by the U.S. Department of Education should be inferred."

# COMPUTER-MANAGED AND AIDED INSTRUCTION PROJECT PHASE III

## EXECUTIVE SUMMARY

The Chancellor's Office of the California Community Colleges in September 1988 approved the continuation of the Vocational Education Computer-Managed and Aided Instruction Project directed and managed by Sierra Community College. In this phase of the project, Phase III, the following major objectives have been met:

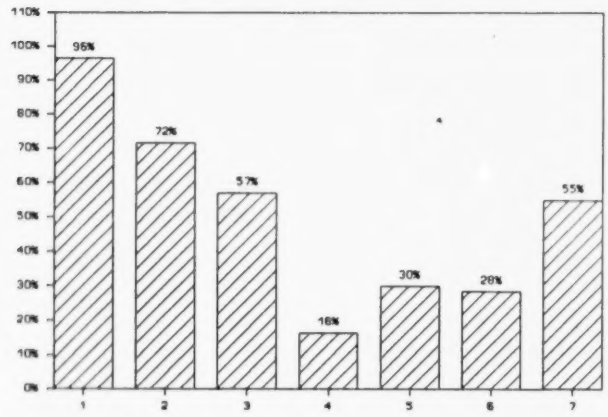
1. Updating software.
2. Evaluating programs not completed in phase II.
3. Conducting workshops.
4. Publishing and distributing Phase II of the directory.
5. Strengthening evaluation instruments.

The concept of Lead College Directors was continued for the five vocational areas: Automotive, Construction, Drafting, Electronics and Manufacturing Technologies. Due to the resignation of the Automotive Lead College Director near the conclusion of Phase II, no updates of the Automotive area were accomplished. A new lead college director for Automotive Technology will be solicited during Phase IV.

During Phase III the importance of the need to update software evaluations became more apparent. As a result, a major emphasis of workshops was devoted to updating instructors on the changes in software programs which could affect their curriculum. A total of 25 software programs where evaluated during this phase with a retail value of over $70,000 and increased the total evaluated for the project to 232 with a value of over $360,000.

Major emphasis was placed on in-service workshops and presentations on the project by conducting thirteen workshops and three presentations for over 270 people.

A survey of 197 educators showed a strong support of the project, with 96% endorsing the continuance of the project. Detailed results of the usefulness of the directory/project are included in the following illustration.




Usefulness of the Directory/Project

1 = Continue Project

**How has the project been useful to you?**

2 = Increased instructor knowledge
3 = Helped in software selection
4 = Identified new course curriculum
5 = Identified update areas for course
6 = Identified new industry knowledge
7 = Software evalution results

A solid foundation for providing a central body of knowledge and a means for a permanent linkage between industry and education continued to strengthen during Phase III. The project has been continued through October 1989. Subsequent to that time, co-sponsorship with the California Department of Education and other educational agencies is being developed. Phase III continued to identify the need for this type of project on an on-going basis in order to keep up with the rapidly changing vocational education technical areas. Without reservation, this project should be continued by joint sponsorship of educational agencies and private industry.

California Community Colleges
1988-89

# ABSTRACT

## PHASE IV


| | |
|---|---|
| I.D. Number: | 87-0535 |
| Project Title: | Computer-Managed and Aided Instruction in Industrial Education Areas |
| Project Director: | Dr. Paulette J. Perfumo-Kreiss<br>Associated Dean of Vocational Education |
| Organization: | Sierra Joint Community College District |
| Address: | 5000 Rocklin Road<br>Rocklin, CA 95677 |
| Phone: | (916) 624-3333 Ext. 2452 |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This is a continuing project which identifies computer software for industrial education under five (5) major disciplines [automotive, building construction, drafting, electronics/electrical and manufacturing technology]. The evaluations accomplished under the management direction of the 3C Voc Tech Software Center will be done by or directed by "lead colleges" who have established an expertise in each subject area. The project evaluates the software and provides in-service training for instructors on its utilization. The end product will be an update of a library of computer software which has been evaluated for use at the community college level, complete with its rating. This effort may be compared with the consumer report of information for the use by industrial education instructors.

The current project, directed and managed by Sierra College, through the California Community Colleges Vocational Technical Software Center (3C Voc Tech Software Center), has received overwhelming support from both industry and the education community. During previous phases of the project, over four hundred educators from community colleges, four year institutions, and secondary schools participated. In addition, over 140 vendors, which is growing everyday, participated in the project by responding to surveys, and making literature and software programs available for evaluation. It is projected that by the end of Phase IV, a value in excess of $450,000 worth of software will have been evaluated since the beginning of the project.

## OBJECTIVES

## PHASE IV

1. Refine, update, improve, expand software library in each of the following industrial education areas:

   a. Automotive Technology
   b. Construction and Cabinetry Technology
   c. Drafting Technology
   d. Electronics Technology
   e. Manufacturing Technology

   A specific objective will be to broaden the applications in each of these areas to be covered which were not covered during the projects previous phases. Update and develop new evaluation instruments where needed. Current on going software evaluations will identify instruments which can be improved. First and second phase evaluations will be updated based upon the latest versions of software products.

2. Continue to develop and refine the concept of a central body of knowledge or lead college in each of the subject areas. Consider expanding the number of lead colleges in drafting, electronics, and manufacturing to include the Southern California area. Establish the requirements for their selection. Time and budget permitting, expand the project to other subject areas.

3. Update the software directory for each subject area semi-annually. The following information will be listed for each product:

   a. Short description of each product as it can be used in education.
   b. Applicability of each package to each subject area within each discipline.
   c. The applicability of the package in the industry and its usefulness in the educational environment.
   d. Cost of the software for industry and to education.
   e. Ranking the products against like type systems.

4. Conduct workshops on software evaluated in the southern and northern parts of California. Workshops will emphasize how the integration of microcomputer technology in the curriculum enhances the integration of gender equality and other disadvantaged into the industrial trades sector of the economy.

5. Develop a computer network between the California Community Colleges Vocational Technical Software Center (3C Voc Tech Software Center) and lead colleges. The primary purpose of this linkage will be to reduce time, cost, and improve coordination of software evaluations. Time and budget permitting, develop an electronic bulletin board for dispensing information to all community colleges. Take necessary action to follow-up with instructors and Deans of Vocational Education to determine the effectiveness of the project.

# FINAL REPORT

# PHASE IV

## 1986-89 VOCATIONAL EDUCATION SPECIAL PROJECT

## COMPUTER-MANAGED AND AIDED INSTRUCTION

## PROJECT 87-0535

## SIERRA COMMUNITY COLLEGE

**PROJECT DIRECTOR**
Dr. Paulette Perfumo-Kreiss

**PROJECT MANAGER**
Mr. Tom Castaldo

March 1, 1989 through November 30, 1989

This report is made pursuant to contract number II-6-351-04. This project was supported by Vocational Education Act of 1984 funds (Title II, Part B), P.L. 98-524, administered by the Chancellor's Office, California Community Colleges.

"The activity which is the subject of this report was supported in whole or in part by the U.S. Department of Education. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Education and no official endorsement by the U.S. Department of Education should be inferred."

# COMPUTER-MANAGED AND AIDED INSTRUCTION PROJECT PHASE IV

## EXECUTIVE SUMMARY

In March, 1989, the Chancellor's Office of the California Community Colleges approved the continuation of the Vocational Education Computer-Managed and Aided Instruction Project which is directed and managed by Sierra Community College. During this phase of the project, Phase IV, the following major objectives were met:

1. Evaluated updated versions of previously evaluated software.
2. Evaluated new programs not previously evaluated.
3. Conducted workshops.
4. Published and distributed Phase III of the directory.
5. Redesigned, rewrote, updated and strengthened the evaluation instruments.
6. Developed and implemented a Bulletin Board system on California Community College Bulletin Board
7. Prepared for project expansion with California Secondary System.

The concept of having Lead College Directors was continued for the five vocational areas: Automotive, Construction, Drafting, Electronics and Manufacturing Technologies. Due to the illness and subsequent resignation of the new Automotive Lead College Director near the conclusion of Phase III, no updates of the Automotive area were accomplished. A new lead college director for Automotive Technology will be solicited during Phase V.

Because of the release of new versions of previously evaluated software, the importance of the continuing need to update software evaluations became more apparent resulting in a major emphasis of workshops being devoted to updating instructors on the changes in software programs which could affect their curriculum. A total of 26 software programs where evaluated during this phase with a retail value of over $83,000 which increased the total evaluated for the project to 259 with a value of over $466,000.

Twelve in-service workshops/presentations on the project were given with 414 participants. A survey of educators showed a strong support of the project, with 96% endorsing the continuation of the project.

A significant accomplishment during Phase IV was the redesigning, rewriting, updating, and strengthening of the General, Construction, CAD and Electronics evaluation instruments. The results are evaluation instruments which are more comprehensive and objective but easier and less time consuming for the evaluators.

The CMAI project has been implemented on INFO-NET, the California Community College Bulletin Board. This has resulted in increasing the efficiency of the communication between the 3C Voc Tech Center and the lead college directors. It will also result in disseminating evaluation results to instructors more quickly and keeping them informed of workshops and presentations in their subject areas.

The project has created a solid foundation of a central body of knowledge and a means of disseminating that information to the technical vocational instructors. Additionally, a permanent linkage between industry and education has been built and was strengthened during Phase IV. The project has now been co-sponsored by the California Department of Education and the California Community Colleges Chancellor's Office which will increase the exposure of the project to the secondary school instructors.

Phase IV continued to identify the need for this type of project on an on-going basis in order to keep up with the rapidly changing vocational education technical areas. National application of this project should be explored by joint sponsorship by educational agencies and private industry.

## ABSTRACT

## PHASE V


| | |
|---|---|
| Project Title: | Computer-Managed and Aided Instruction in Industrial Education Areas |
| Project Director: | Dr. Paulette J. Perfumo-Kreiss<br>Associated Dean of Vocational Education |
| Organization: | Sierra Joint Community College District |
| Address: | 5000 Rocklin Road<br>Rocklin, CA 95677 |
| Phone: | (916) 624-3333 Ext. 2452 |


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This project (CMAI) identifies and evaluates computer software for industrial and technology education. The evaluations are in the six major disciplines of automotive technology, construction technology, drafting technology, electronics technology, electronic publishing technology, and manufacturing technology.

The actual evaluations will be done by or directed by "lead subject area directors," who have established an expertise in each subject area. The project evaluates the microcomputer software applications and provides in-service training on its utilization within education to instructors.

This 1989-90 project will be a joint project by the Industrial and Technology Education Unit of the State Department of Education and the Vocational Education Unit of the Chancellor's Office, California Community Colleges. One half of the funding will be provided by the State Department of Education and the other half by the Chancellor's Office, California Community Colleges.

Earlier projects directed and managed by Sierra College through the California Community Colleges Vocational Technical Software Center, have received overwhelming support from both industry and education communities. During these projects, over four hundred educators from community colleges, four year institutions and secondary schools participated. In addition, over 140 industry and business vendors, whose numbers are growing daily, participated in the project by responding to surveys, and making literature and software programs available for evaluation. More than 1100 copies or partial copies of the software directory have been distributed.

Initially the project was targeted toward community colleges, but the results showed that the directory was also beneficial at the secondary vocational level of instruction. As a result, the California State Department of Education distributed the directory to secondary vocational instructors through the 1988 California Industrial Technical Education Consortium (CITEC) annual conference.

## OBJECTIVES

## PHASE V

1. The end product is a library of evaluated computer software for use at the secondary and community college levels, complete with its rating. This effort may be compared to the consumer report of information for use by Industrial and Technology Education instructors. The project will refine, update, improve, and expand software libraries in each of the following industrial and technology education areas:

   a. Automotive Technology
   b. Construction Technology
   c. Drafting Technology
   d. Electronics Technology
   e. Manufacturing Technology
   f. Electronic Publishing Technology

2. Evaluate new software that has not been covered during previous projects.

3. Review and update the software evaluation instruments.

4. Maintain a current software directory by evaluating the latest versions of previously evaluated computer software programs.

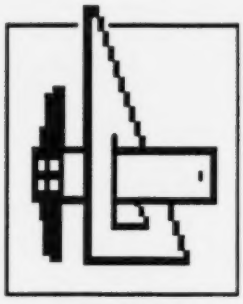
5. Develop a new instructional area of the project to include "Electronic Publishing Technology".

# CONCEPT OF OPERATIONS

## CONCEPT OF OPERATIONS

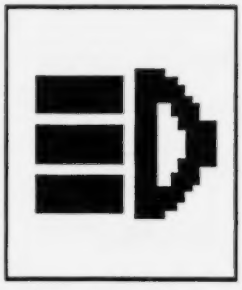
**The 3C Vocational Technical Software Evaluation Center was created to identify, categorize, and evaluate vocational education software, to provide educators with a software directory, and to conduct workshops to help in the selection and incorporation of software into the curriculum, in five subject areas with five lead colleges.**

## CONCEPT OF OPERATIONS



Drafting

Automotive



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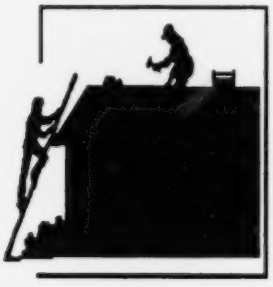
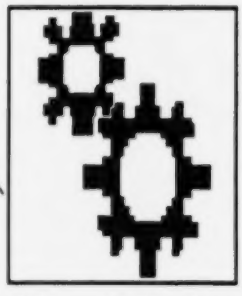
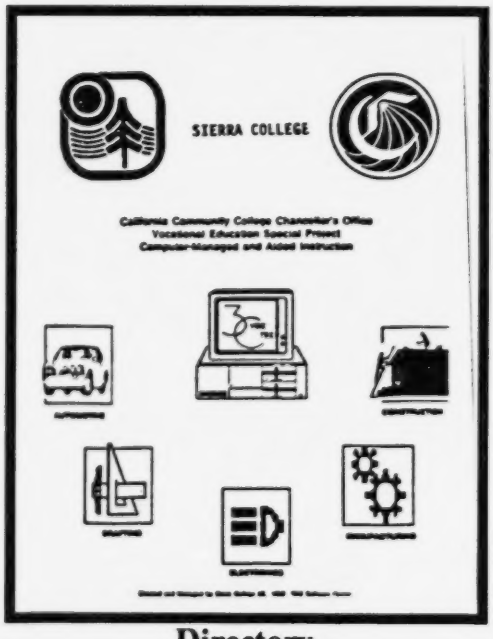


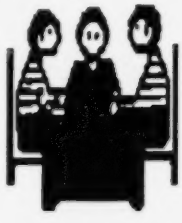
Construction

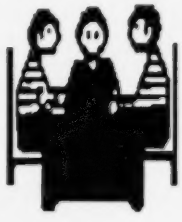


Manufacturing

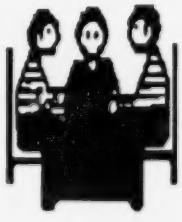



Directory





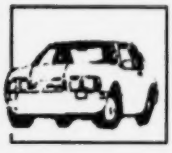
State Wide
Workshops



# COMPUTER MANAGED AND AIDED INSTRUCTION PROJECT

## LEAD SUBJECT DIRECTORS

### AUTOMOTIVE TECHNOLOGY



Glenn Ogawa
Kings River Community College
995 North Reed Avenue
Reedley, CA. 93654
(209) 638-3641 Ext. 251
Bulletin Board User-ID: CMAIAuto

### CONSTRUCTION TECHNOLOGY

Craig Chamberlain
Sierra Community College
5000 Rocklin Road.
Rocklin, CA. 95677
(916) 624-3333 Ext. 2235
Bulletin Board User-ID: CMAIConst

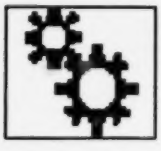
### DRAFTING TECHNOLOGY

Dr. Don Obendorf
Solano Community College
4000 Suisun Valley Road
Suisun City, CA. 94585
(707) 864-7000 Ext. 201
Bulletin Board User-ID: CMAIDraft

### ELECTRONICS TECHNOLOGY

Keith Brown
Santa Rosa Junior College
1501 Mendocino Avenue
Santa Rosa, CA. 95401
(707) 527-4674
Bulletin Board User-ID: CMAIElect

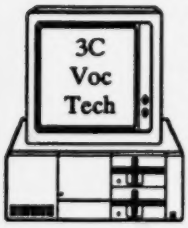
### MANUFACTURING TECHNOLOGY



George Richardson
Mount San Antonio College
1100 North Grand Avenue
Walnut, CA. 91789
(714) 594-5611 Ext. 768
Bulletin Board User-ID: CMAIManuf

## MAIN OFFICE AND BULLETIN BOARD

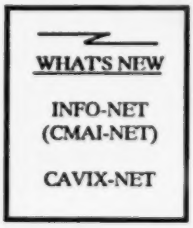
### 3C Voc Tech Software Center




Tom Castaldo (Project Manager)
Carole Janicke (Directory Coordinator)
Matt Ferrell (Programmer/Analyst)

Sierra Community College
5000 Rocklin Road
Rocklin, CA. 95677
(916) 624-3333 Ext. 2001
Bulletin Board User-ID: CMAI

### Computer Bulletin Board




-Directory Information
-Direct Connection with
Lead Subject Directors

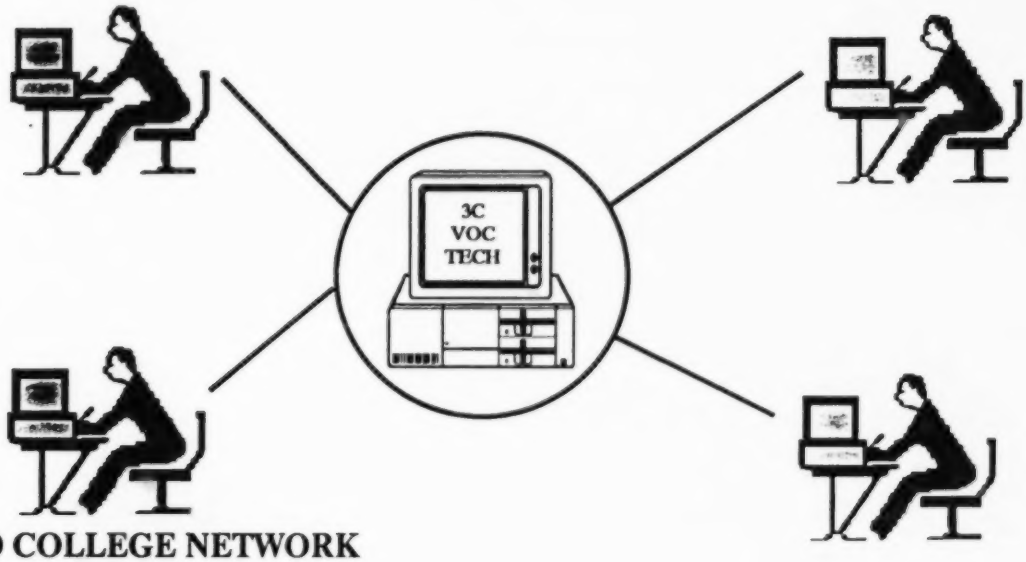
**INFO-NET (CMAI-NET)**
(209) 577-3081
**CAVIX-NET**
(800) 544-9328

## CMAI-NET

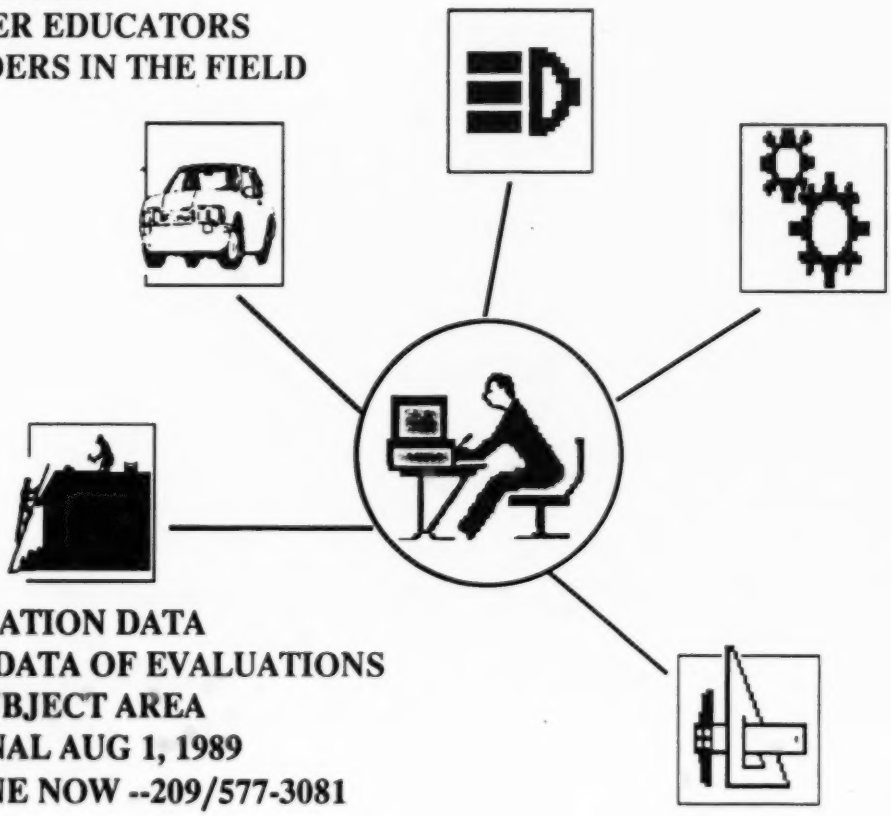
**The electronic bulletin board, CMAI-NET, went on-line on the Info-Net bulletin board system August 1, 1989. It established an interlinking network between the 3C Voc. Tech. Software Center, the lead college directors and educators. The bulletin board provides a summary of the software evaluations in each of the five subject areas of automotive, electronics, construction, drafting, and manufacturing, which will be updated as the new evaluations are completed. Besides using the bulletin board to review the software evaluations, educators can also use this system to communicate directly with the 3C Voc. Tech. Software Center, with the individual college leads or with each other.**

## CMAI-NET

**CMAI-NET ELECTRONIC MAIL**
- **-CONTACT WITH 3C VOC TECH SOFTWARE CENTER**




**LEAD COLLEGE NETWORK**
- **-EVALUATION UPDATE**
- **-DIRECT CONTACT**
  - **--OTHER EDUCATORS**
  - **--LEADERS IN THE FIELD**



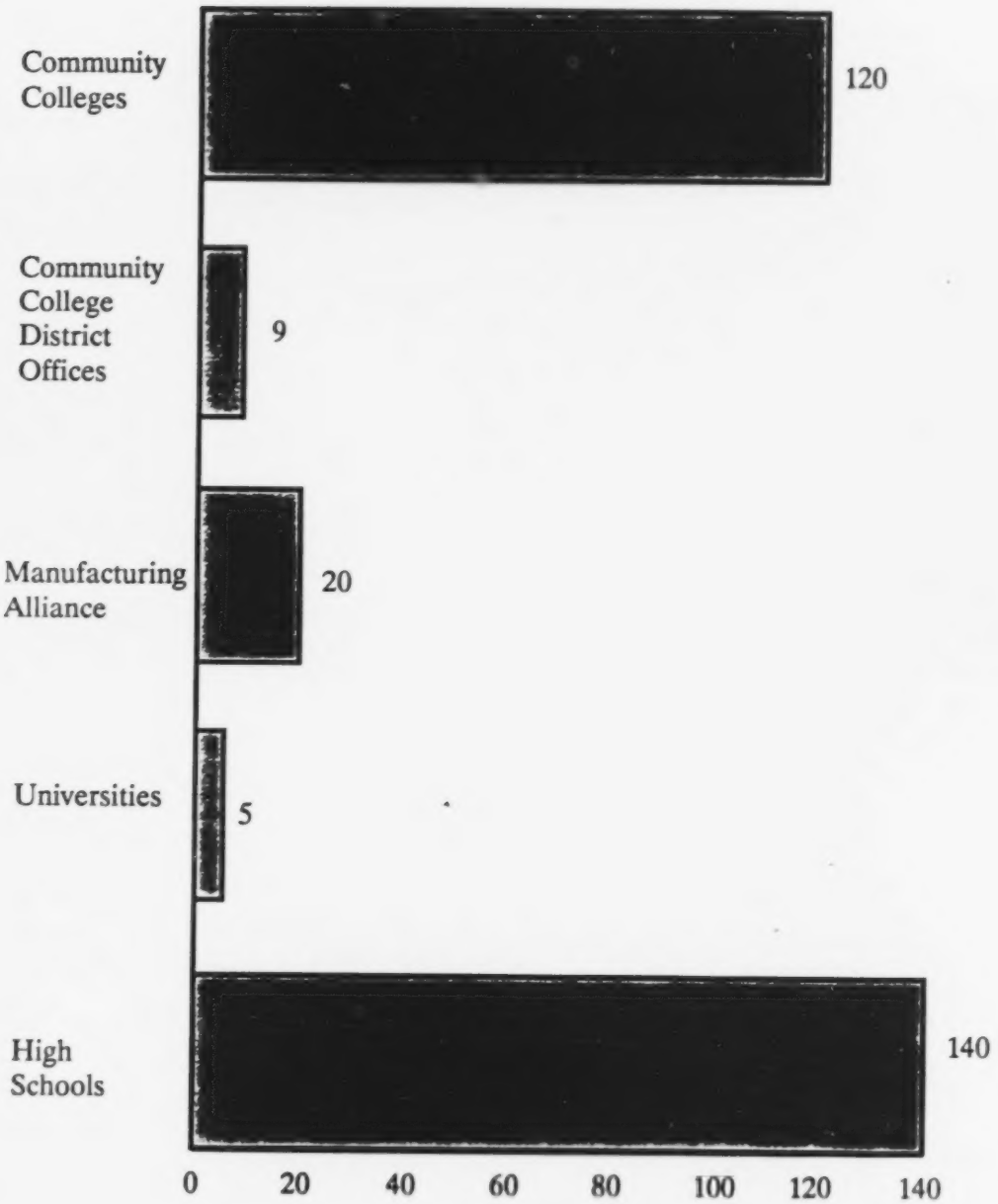
**CMAI-NET EVALUATION DATA**
- **-SUMMARY DATA OF EVALUATIONS**
  - **--BY SUBJECT AREA**
- **-OPERATIONAL AUG 1, 1989**

**CMAI-NET ON LINE NOW --209/577-3081**

# ACCOMPLISHMENTS AND RESULTS

**294 institutions are participating in the project and are broken down by type**

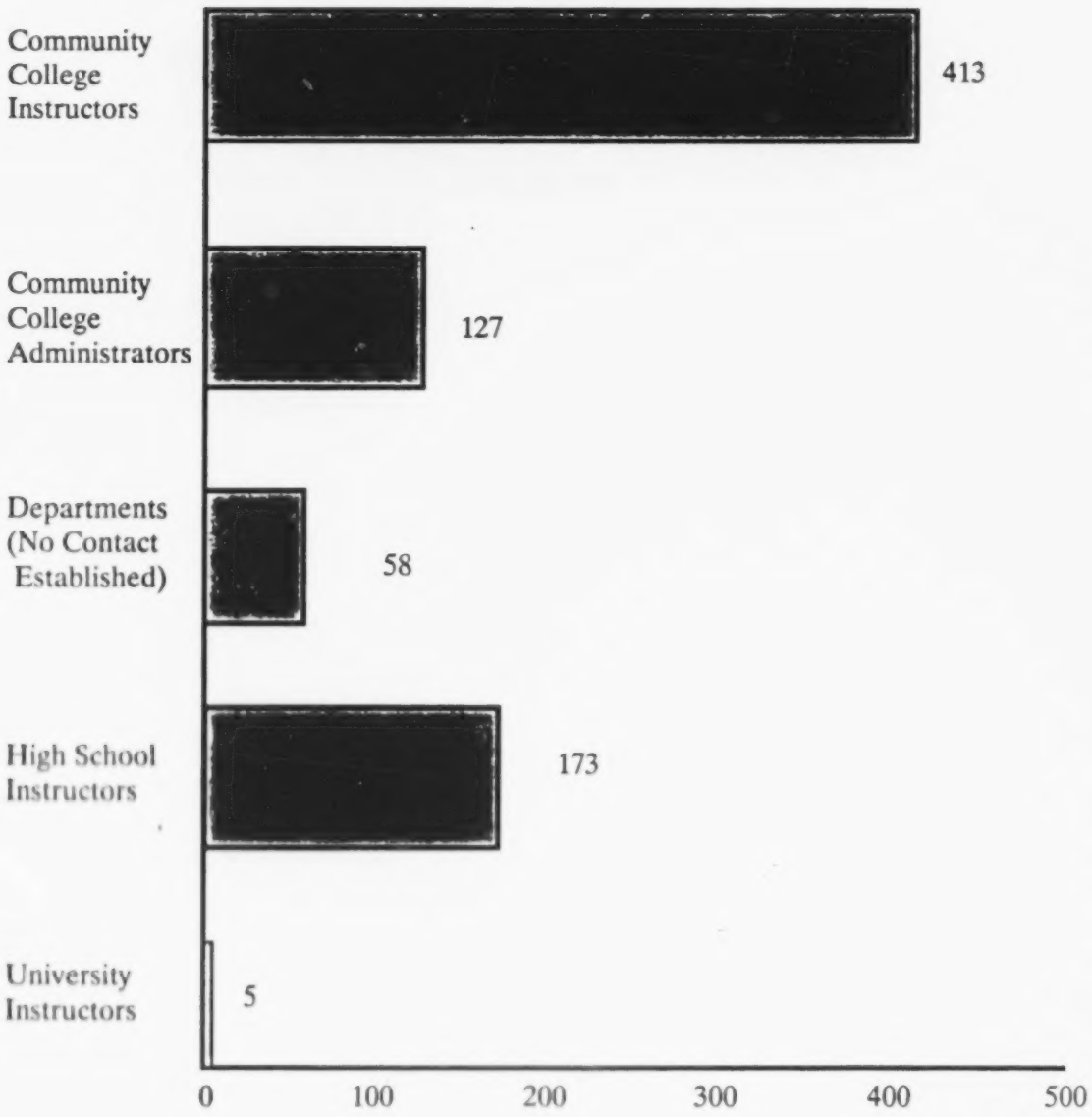
## Participating Institutions




Total: 294

**There are 718 people who are actively participating in the project, the bar chart illustrates the number of educators by type participating**

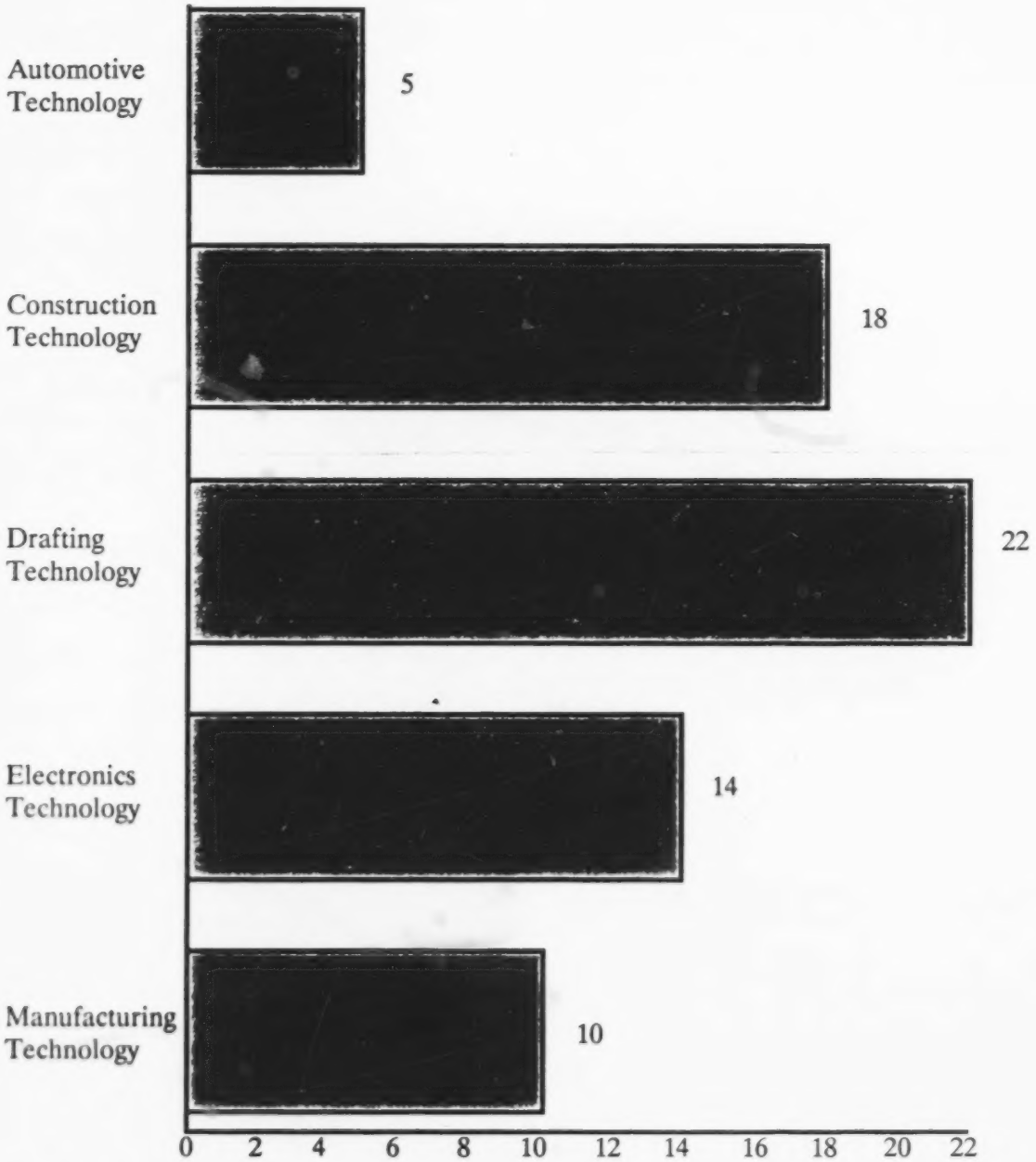
## Project Participants




Total: 718

**This graph illustrates the 69 vendors participating in the project by subject area. A number of vendors are participating in more than one subject area.**

## Vendor Participation




**Total: 69**

## TANGIBLE BENEFITS

-259 SOFTWARE PROGRAMS EVALUATED

- 139 COMMERCIAL
- 120 PUBLIC DOMAIN

-POSITIVE INDUSTRY SUPPORT FOR PROJECT

-$466,000+ VALUE OF SOFTWARE EVALUATED

-DIRECTORIES DISTRIBUTED

- PHASE I - 1100
- PHASE II - 625

-40 WORKSHOPS/PRESENTATIONS CONDUCTED

- 763 TOTAL PARTICIPANTS
  - -508 COLLEGE
  - -255 HIGH SCHOOL

## INTANGIBLE BENEFITS

### TECHNOLOGY INSTRUCTORS

-REFERENCE DOCUMENT OF SOFTWARE APPLICATIONS

- ▸WHAT RESOURCES ARE AVAILABLE

-PROVIDES AN EXPERT BODY OF KNOWLEDGE

- ▸HOW TO USE IN CLASS
- ▸HOW GOOD ARE RESOURCES

-EXPOSURE AND COMPUTER TRAINING

- ▸UPGRADE/TRAIN IN COMPUTER TECHNOLOGIES

-TIME SAVER

### INDUSTRY

-EXPOSURE OF PRODUCT

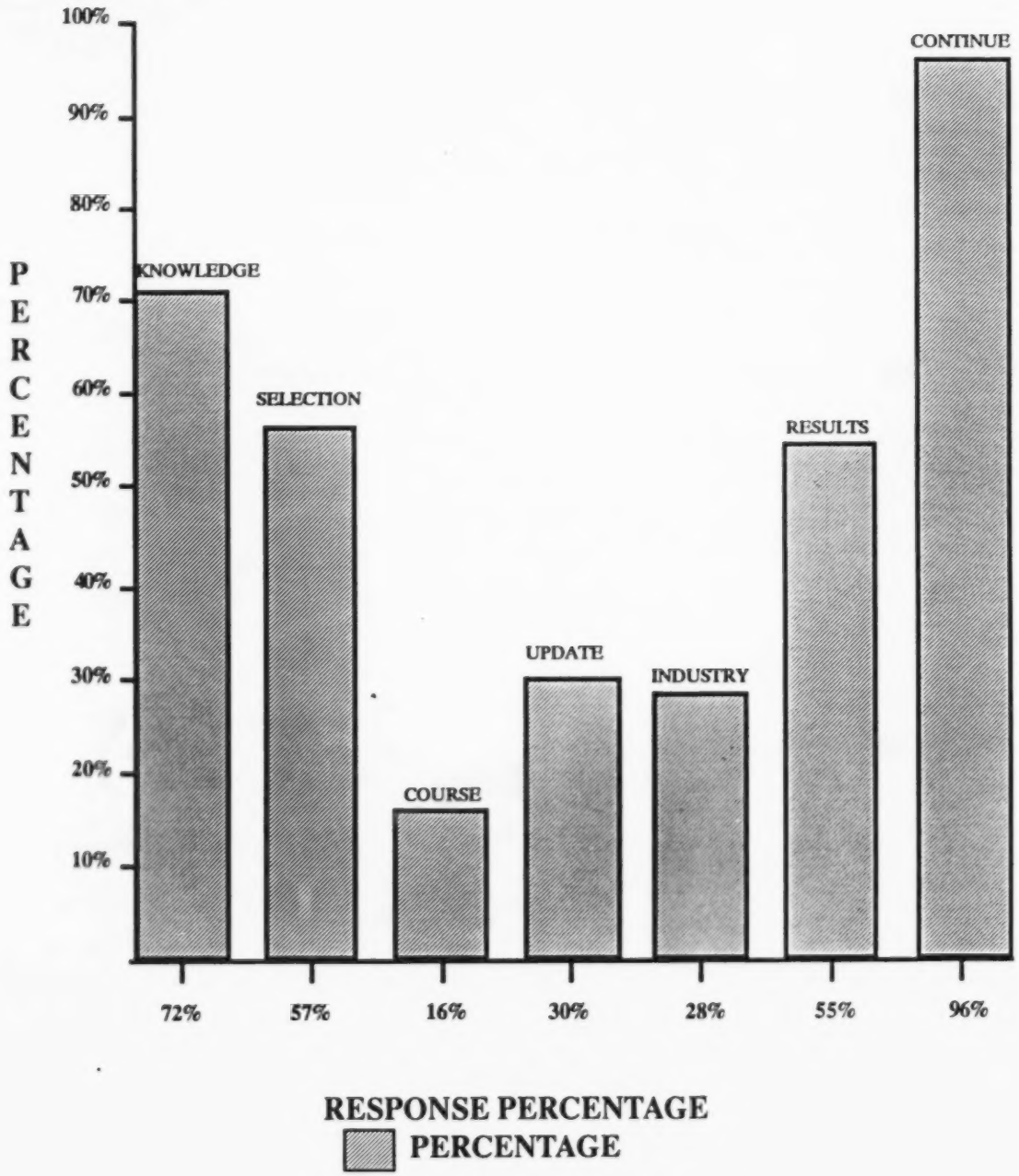
-EVALUATED FOR EDUCATION MARKET PLACE

-LONG RANGE: TRAINED PEOPLE IN STATE OF ART

## SURVEY RESULTS OF PROJECT

**Surveys were conducted by the 3C Vocational Technical Software Center to help in assessing the value of the project. Results of the survey show an overwhelming ninety-six percent of those responding supported the continuation of the project. Seventy-two percent of the respondents said that the software directory and workshops increased their knowledge and fifty-seven percent indicated they were helped in their selection of new software while fifty-five used the results in some manner. Identifying areas for course updating was indicated by thirty percent of the respondents and twenty-eight percent said identifying new industry knowledge was one area in which they were helped. Sixteen percent of those surveyed said that the directory and workshops identified new course curriculum.**

## SURVEY RESULTS OF PROJECT



-NATIONAL PARTICIPATION

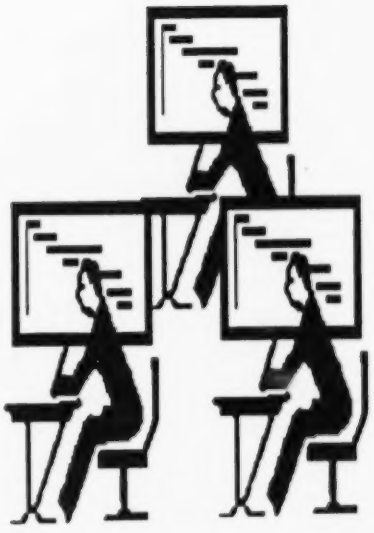
-THE NEED

EDUCATION

INDUSTRY

GOVERNMENT

-FUNDING SUPPORT



ERIC Clearinghouse for
Junior Colleges FEB 1 1990